

UNITED STATES PATENT APPLICATION

of

WOLFGANG HAUSER,

VIKTOR HEITZLER

and

CHRISTIAN JOOS

for

RELATING TO AN ELECTRONIC COMPONENT WITH A LEADFRAME

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BACKGROUND OF THE INVENTION

The present invention relates to the field of semiconductors, and in particular to semiconductor packaging.

In general, an electronic component includes a leadframe composed of at least one
10 platform and possibly at least one electronic connector, at least one electronic member,
and a housing. The at least one electronic member here is located on the platform. In
addition, the electronic member and platform are generally completely enclosed by the
housing.

The housing of the electronic component is generally fabricated by a molding
15 process, the so-called molding procedure. In the molding procedure, the part of the
leadframe to be molded, specifically, the platform, together with the electronic member
disposed on the platform, projects unprotected into the cavity of the mold, the so-called
molding die. During molding, the molding compound is introduced under high injection
pressures into the cavity of the mold. In addition, a nonuniform distribution of pressure
20 exerted by the molding compound is present in the cavity during the molding procedure.
The result is that the section of the leadframe projecting into the cavity may be bent
during molding. The consequence of this is that the electrical and magnetic properties of
the electronic member may be altered in an undesirable manner. For example, the
sensitivity of a Hall sensor may be degraded by the tilting of the platform on which the
25 sensor element is located.

5 Therefore, there is a need for an electronic component, or a method for fabricating an electronic component, in which the above-described tilting risk for the leadframe is prevented.

SUMMARY OF THE INVENTION

10 An electronic component includes a leadframe, composed of a platform and preferably at least one electrical connecting piece. The electronic component has at least one electronic member which is located on the platform. The electronic component also includes a housing that encloses the electronic member and the platform. In the electronic component, there is at least one support region on the platform to support the platform
15 during the fabrication process creating the housing, and at least a section of the at least one support region projecting from the housing of the electronic component.

 The region of the leadframe (i.e., the platform projecting exposed into the cavity of the molding die during the molding procedure) is supported by a molding die. As a result, molding compound is not accumulated during the molding procedure in the section of the
20 support region supported by the molding die – with the result that at least a section of the support region projects from the housing.

 In one embodiment, at least one support region is designed as a lobe element molded onto the platform. In another embodiment, the at least one lobe element is molded onto the platform forming a single piece, allowing the platform and lobe element to be
25 inexpensively fabricated as a stamped piece.

 Since at least a section of the lobe element or support region projects from the housing, at least a section of the lobe element or support region is directly exposed to

5 ambient moisture. In order to prevent any penetration of ambient moisture into the housing in the transition zone between the platform and the lobe element or support region, and thus into the housing, a notch-like depression is provided along the transition zone.

10 In another preferred embodiment, the at least one connecting piece is molded onto the platform forming a single piece, thereby forming the connecting piece and platform as one integrated unit. Here at least a section of the connecting piece is guided outside the housing. As a result, during the molding procedure the leadframe may receive additional support by the connecting piece.

15 The electronic component may include three or more connecting pieces that run parallel and on one side of the housing. A embodiment of this design is, for example, a Hall sensor.

A thin anticorrosive film may extend over at least a section of the lobe element. For example, the support region may be covered by a thin film of the housing plastic. The thin film may, for example, be created during fabrication of the housing by generating a
20 small cavity between the support region and the mold, the cavity being filled by the plastic when the plastic is injected.

The leadframe may be fabricated by a metal or metal alloy. At least a section of the surface of the leadframe may be coated, and in particular, coated with an alloy containing tin or tin-lead.

25 During molding the support region of the leadframe projecting into the cavity of the mold, that is, at least one region of the platform, is supported by the mold. At least one pin-like element be provided in the upper and lower shell of the mold, with the result

5 that the support region is jammed between the pin elements of the upper and lower shells
of the mold during the molding procedure. The pin elements may be configured as
integral components of the sidewall of the mold shells, of the molding die, or mold.

These and other objects, features and advantages of the present invention will
become more apparent in light of the following detailed description of preferred
10 embodiments thereof, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic drawing of a top view an electronic component;

FIG. 2 is a side view of the electronic component;

15 FIG. 3 is a perspective view of the electronic component; and

FIG. 4 shows the electronic component during fabrication of the housing in a
sectional view along A-A in FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

20 FIG. 1 is a top view of an electronic component 1 that includes a leadframe 2, an
electronic member 3 and a housing 4. The electronic component 1 includes a leadframe
made of a metal alloy. The housing 4 is made of a plastic such as epoxy resin. In this
example, the electronic member 3 of electronic component 1 is configured as a Hall
sensor.

25 The leadframe 2 includes a platform 5 and three parallel connecting pieces 6', 6".
In this example, the connecting piece 6' is molded onto the platform 5 as one piece.
Connecting pieces 6" project into the housing 4 of the electronic component 1, without

5 directly contacting platform 5. The electronic member 3 is located on the platform 5. Electronic contact between the electronic member 3 and the connecting pieces 6' and 6" is provided by bonds 21 within the housing 4. The electrical connection of the electronic member 3 to the region outside the housing 4 is provided by the connecting pieces 6' and 6". Additionally, two opposing lobe elements 7 are molded onto the platform 5, forming
10 one piece. The housing 4 has holes 8 in the region of each lobe element 7, the holes being identified as support holes. The section 9 shown dark in FIG. 1 represents the overlap zone between each lobe element 7 and each support hole 9, that is, each lobe element 7 in overlap zone 9 projects beyond housing 4. Also provided in the transitional zone between the platform 5 and the lobe element 7 is one notch-shaped depression 10, which prevent
15 ambient moisture in the region of support holes 8 from penetrating into the housing 4.

FIG. 2 is a side view of the electronic component 1 described in FIG. 1, where within the housing 4 only the platform 5 and lobe element 7 are shown. The support hole 11 located on the bottom side of housing 4. The support hole 11 is located opposite support hole 8. The effect of the support hole 11 is that a section of the bottom side of the
20 lobe element 7 projects from the housing 4. The effect of the support hole 8 is that, as already described in FIG. 1, the top side of the lobe element 7 projects from the housing 4. The platform 5 is supported by the lobe element 7 on both sides against mold 12 (shown in FIG. 4) in the region of support holes 8 and 11, thereby preventing tipping of the platform 5 during the molding procedure.

25 FIG. 3 is a perspective view the providing a clearer understanding of electronic component 1. FIG. 4 shows electronic component 1 during fabrication of housing 4 in a sectional view along axis A-A in FIG. 1. Molding die 12 is clearly recognizable,

5 composed of an upper mold shell 13 and a lower mold shell 14. During the molding
procedure, mold shells 13 and 14 are brought into contact along parting plane 18 such that
a closed cavity is formed by molding die 12, composed of cavity halves 15 and 16. A
channel 17 to fill cavity halves 15 and 16 with the molding compound is shown, simply as
an example, in lower mold shell 14. It is also evident that opposing lobe elements 7
10 molded on forming a single piece with platform 5 are supported in the region of parting
plane 18 by upper mold shell 13 and lower mold shell 14. Recesses 19 are provided in
upper mold shell 13, and recesses 20 are provided in lower mold shell 14 to accommodate
each lobe element 7, with recesses 19 and 20 forming a matching space for each
accommodated lobe element 7 in the state in which mold shells 13 and 14 are pressed
15 together.

Although the present invention has been shown and described with respect to
several preferred embodiments thereof, various changes, omissions and additions to the
form and detail thereof, may be made therein, without departing from the spirit and scope
of the invention.

20 What is claimed is: